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REMARKS

This response is intended as a complete and full response to the Office Action dated September 19, 2005. In view of the following discussion, the Applicants believe that all claims are in allowable form.

CLAIM REJECTIONS**A. 35 USC §102 Claims 1-11**

Claims 1-11 stand rejected as being anticipated by United States Patent No. 6,406,924 issued June 18, 2002, to *Grimbergen, et al.* (hereinafter *Grimbergen*). In response, the Applicants have amended claims 1 and 11 to more clearly recite aspects of the invention.

Independent claims 1 and 11, as amended, recite limitations not taught or suggested by *Grimbergen*. With respect to 35 USC §102, or "anticipation," the Federal Circuit has repeatedly stated that "there is no anticipation unless all of the same elements are found in exactly the same situation and united in the same way . . . in a single prior art reference." Perkin-Elmer Corp. v. Computervision Corp., 732 F.2d 888, 894 (Fed. Cir., 1984); Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 771, 218 U.S.P.Q. (BNA) 781, 789 (Fed. Cir. 1983). Here, *Grimbergen* does not identify each of the claimed elements as arranged in independent claims 1 and 11 so as to establish a *prima facie* case of anticipation.

Grimbergen teaches a endpoint detection method for use in the fabrication of electronic devices. Specifically, *Grimbergen* teaches selection of a radiation having a wavelength that is substantially absorbed in a first thickness of a layer disposed on a substrate and that is at least partially transmitted through a second thickness of the layer after processing. (*Grimbergen*, Abstract; Summary, col. 8, ll. 15-60.) *Grimbergen* does not directly discuss the relationship between the thickness of the material layer and the wavelength of the radiation used for endpoint detection. Rather, *Grimbergen* teaches that the wavelength of the radiation is selected to be substantially absorbed in a first thickness of the layer. In the two examples given, *Grimbergen* teaches a wavelength of 365 nm for etching a 5000 Angstrom and a 2000 Angstrom polysilicon layer.

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However, *Grimbergen* does not discuss etching a high-k dielectric material layer (or gate dielectric layer). Moreover, *Grimbergen* does not teach or suggest endpoint detection techniques using a pre-selected wavelength that is greater than or on the order of the initial thickness of the material layer. As noted above, the examples provided by *Grimbergen* utilize wavelengths in nanometers (e.g., 365) that are less than the thickness of the layers in Angstroms (e.g., 5000 or 2000).

As such, *Grimbergen* fails to teach or suggest an etch endpoint detection process by etching a high-k dielectric layer disposed on a substrate and measuring a change in intensity for radiation reflected from the substrate at a pre-selected wavelength, wherein the pre-selected wavelength in nanometers is greater than or on the order of the initial thickness of the material layer in Angstroms, as recited in claims 1 and 11. Therefore, a *prima facie* case of anticipation has not been established because *Grimbergen* does not identify each of the claimed elements as arranged in independent claims 1 and 11.

Thus, claims 1-11 are patentable over *Grimbergen*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

B. 35 USC §103 Claim 5

Claim 5 stands rejected as being unpatentable over *Grimbergen* in view of United States Patent No. 6,160,621 issued December 12, 2000, to *Perry, et al.* (hereinafter *Perry*). In view of the above amendments to claim 1, the Applicants respectfully disagree.

Independent claim 1, from which claim 5 depends, recites limitations not taught or suggested by any combination of *Grimbergen* and *Perry*. The patentability of claim 1 over *Grimbergen* has been discussed above. *Perry* teaches a method for monitoring plasma etching and deposition processes using a broadband light source. However, *Perry* fails to teach or suggest etching high-k materials. Moreover, *Perry* fails to teach or suggest endpoint detection techniques using a pre-selected wavelength that is greater than or on the order of the initial thickness of the material layer.

Accordingly, the teachings of *Perry* cannot be used to modify *Grimbergen* in a manner that yields an etch endpoint detection process that etches a high-k dielectric

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layer disposed on a substrate and measures a change in intensity for radiation reflected from the substrate at a pre-selected wavelength, wherein the pre-selected wavelength in nanometers is greater than or on the order of the initial thickness of the material layer in Angstroms, as recited in claim 1. Therefore, a *prima facie* case of obviousness has not been established because the combination of *Grimbergen* and *Perry* fails to yield each of the claimed elements of independent claim 1.

Thus, claim 5 is patentable over *Grimbergen* in view of *Perry*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claim allowed.

C. 35 USC §103 Claims 11-15 and 17-21

Claims 11-15 and 17-21 stand rejected as being unpatentable over United States Patent No. 5,414,504 issued May 9, 1995, to *Litvak, et al.* (hereinafter *Litvak*) in view of United States Patent No. 6,518,106 issued February 11, 2003, to *Ngai, et al.* (hereinafter *Ngai*). The Applicants respectfully disagree.

Independent claim 11 recites limitations not taught or suggested by any combination of *Litvak* and *Ngai*. *Litvak* teaches an improvement, namely, a method for minimizing interferences from random noise and correlated fluctuations, in an optical monitoring system for determining endpoints. However *Litvak* specifically teaches improvements in the measurement of optical plasma emissions. (*Litvak*, Abstract; Summary of the Invention; col. 5, ll. 64-65 ("A dry etch reactor 2 is the source of emitted light...")) *Litvak* fails to teach or suggest providing a substrate comprising a material layer having an initial thickness, wherein the material layer is a high-k dielectric material layer; directing radiation onto the substrate as the material layer is etched; and measuring a change in intensity for radiation reflected from the substrate at a pre-selected wavelength as the material layer is etched, wherein the pre-selected wavelength in nanometers is greater than or on the order of the initial thickness of the material layer in Angstroms, as recited in claim 11.

The Examiner cites *Ngai* to show that using SiO₂ and HfO₂ as gate dielectrics is well known. However, *Ngai* fails to teach or suggest any etch specific endpoint detection methodologies. Specifically, *Ngai* fails to teach or suggest endpoint detection

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techniques using a pre-selected wavelength that is greater than or on the order of the initial thickness of the material layer.

Accordingly, the teachings of *Ngai* cannot be used to modify *Litvak* in a manner that yields providing a substrate comprising a material layer having an initial thickness, wherein the material layer is a high-k dielectric material layer; directing radiation onto the substrate as the material layer is etched; and measuring a change in intensity for radiation reflected from the substrate at a pre-selected wavelength as the material layer is etched, wherein the pre-selected wavelength in nanometers is greater than or on the order of the initial thickness of the material layer in Angstroms, as recited in claim 11. Therefore, a *prima facie* case of obviousness has not been established because the combination of *Litvak* and *Ngai* fails to yield each of the claimed elements of independent claim 11.

Thus, claims 11-15 and 17-21 are patentable over *Litvak* in view of *Ngai*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

D. 35 USC §103 Claim 16

Claim 16 stands rejected as being unpatentable over *Litvak* in view of *Ngai*, as applied above, and further in view of *Perry*. The Applicants respectfully disagree.

Independent claim 11, from which claim 16 depends, recites limitations not taught or suggested by any combination of *Litvak*, *Ngai*, and *Perry*. The patentability of claim 11 over *Litvak* in view of *Ngai* has been discussed above. As also discussed above, *Perry* fails to teach or suggest endpoint detection techniques using a pre-selected wavelength that is greater than or on the order of the initial thickness of the material layer.

Accordingly, the teachings of *Perry* cannot be used to modify any combination of *Litvak* and *Ngai* in a manner that yields providing a substrate comprising a material layer having an initial thickness, wherein the material layer is a high-k dielectric material layer; directing radiation onto the substrate as the material layer is etched; and measuring a change in intensity for radiation reflected from the substrate at a pre-selected wavelength as the material layer is etched, wherein the pre-selected

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wavelength in nanometers is greater than or on the order of the initial thickness of the material layer in Angstroms, as recited in claim 11. Therefore, a *prima facie* case of obviousness has not been established because the combination of *Litvak*, *Ngai*, and *Perry* fails to yield each of the claimed elements of independent claim 11.

Thus, claim 16 is patentable over *Litvak* in view of *Ngai*, and further in view of *Perry*. Accordingly, the Applicants respectfully request that the rejection be withdrawn and the claims allowed.

CANCELLED, AMENDED, AND NEW CLAIMS

Claims 22-31 have been cancelled without prejudice. The Applicants reserve the right to file divisional applications to pursue the cancelled subject matter.

Claim 32, which is presently withdrawn from prosecution, has been amended the reflect the amendments made to independent claim 1.

New claims 42 and 43 have been added to the application. Claims 42 and 43 contain no new matter and depend respectfully from independent claims 1 and 11. The Applicants respectfully submit that these claims are patentable over the art of record at least for the reasons discussed above.

CONCLUSION

The Applicants submit that all claims now pending are in condition for allowance. Accordingly, both consideration of this application and swift passage to issue are earnestly solicited. If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Alan Taboada at (732) 935-7100 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

3/14/06

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